

(Following Paper ID and Roll No. to be filled in your Answer Book)**PAPER ID : 3301**

Roll No.

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B. Tech.**(Semester-I) Theory Examination, 2011-12****ELECTRONICS ENGINEERING***Time : 3 Hours]**[Total Marks : 100*

Note: Attempt questions from all the three Sections (A, B and C).

Section-A

1. Attempt *all* parts of this question : $2 \times 10 = 20$
 - (a) Does a hole in a semiconductor contribute to a flow of current ? If yes, how and if no, how ?
 - (b) What is the effect of temperature on conductivity of a semiconductor ?

- (c) Derive the relationship between α and β .
- (d) What is the need for biasing a transistor?
- (e) Explain, why BJTs are called bipolar devices and FETs are called unipolar devices.
- (f) What are the different stages of an Op-Amp?
- (g) What are called universal gates? Why are they called so?
- (h) What is meant by duality in Boolean Algebra?
- (i) What are the special features of storage oscilloscopes?
- (j) State the advantages of digital instruments over analog instruments.

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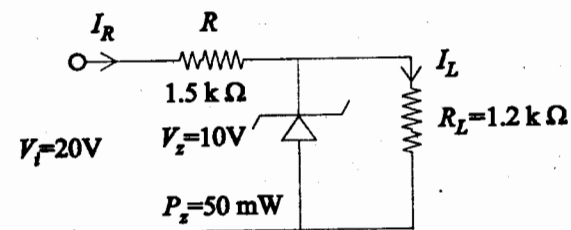
(2)

Section-B

2. Attempt any *three* parts of this question: $10 \times 3 = 30$

(a) (i) What do you mean by Zener and Avalanche breakdown in $p-n$ junction semiconductor diode?

(ii) For the given Zener diode network shown in figure below determine V_L , V_R , I_2 and I_R .



(b) Draw and explain input/output characteristics of CB configuration of BJT.

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(3)

(c) (i) What are the advantages of the FET over a BJT ? Define pinch-off voltage and drain resistance of FET.

(ii) Write the characteristics of an ideal Op-Amp.

(d) (i) Convert decimal number 225 to binary, octal and hexadecimal. Add octal numbers 362 and 215.

(ii) Simplify the given Boolean function F together with don't care conditions in product of sums (POS):

$$F(w, x, y, z) = \Sigma(0, 1, 2, 3, 7, 8, 10)$$

$$d(w, x, y, z) = \Sigma(5, 6, 11, 15).$$

(e) (i) Explain the operation of a basic digital multimeter.

(ii) Describe with the help of a neat block diagram, the working principle of a CRO.

Section-C

This Section has five questions. Attempt any *two* parts of each question : $10 \times 5 = 50$

3. (a) Draw and explain V-I characteristics of p - n junction diode.

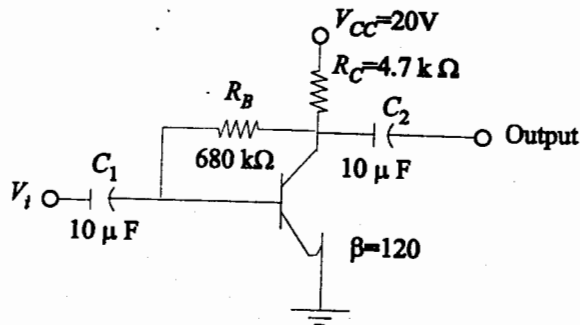
(b) Draw a neat diagram of full wave bridge rectifier and explain its working.

(c) Draw the voltage double circuit and explain its working.

4. (a) Draw the circuit diagram of transistor in CE configuration and sketch its output characteristics.

(b) Draw the hybrid equivalent circuit of CB configuration and find expression for A_i and A_v .

- (c) For the given network shown in figure below determine I_C , V_{CE} , V_B and V_C .



6. (a) Draw the logic diagram of Ex-OR gate using Universal gate (NAND and NOR).

(b) Write and explain the postulates of Boolean Algebra.

(c) A logic circuit implements following Boolean function $F(A, C, D) = A'C + AC'D'$.

It is found that the circuit input combination $A = C = 1$ can never occur. Find a simpler expression for F using proper don't care conditions.

7. (a) Explain how frequency and phase can be measured using a CRO.

(b) Describe the applications of CRO.

(c) Explain the basic principle of a digital voltmeter.

5. (a) What is the significant difference between the construction of an enhancement type MOSFET and depletion type MOSFET? Explain with suitable diagram.

(b) Draw the circuit of Op-Amp as subtractor and find out the expression for output.

(c) Draw and explain transfer characteristics of n -channel JFET.